

SEULBERGER et al.,

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PF 0000048141

**AMENDMENTS TO THE SPECIFICATION**

Please amend paragraph 6, on page 23 of the specification as followed:

**Example 3**

**Homology comparison of the HvSD36 protein sequence SEQ ID NO: 2**

**A comparison of the HvSD36 protein sequence with protein sequences in the database revealed homologies to the following protein sequences known to date:**

Please amend paragraph 1, on page 26 of the specification as followed:

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SEQ ID NO: 2      HPPD_Hv      510      520      530      540      550
                  -----SE LFK-SIE-DY --EKS--LEA KQSAAV-QGS
HPPD_Ath          -----SE LFK-SIE-DY --EKT--LEA KQLVG
HPPD_HUMAN        -----NS LFK-APEKEQ --ELRGMLTH METNGVVPGN
HPPD_RAT          -----NS LFK-APEKEQ --ALRG
HPPD_PIG          -----NS LFK-APEKEQ --ELRGMLTD TDPNGVPPRL
HPPD_MOUSE        -----NS LFK-APEKEQ --ALRGMLTD LEPNGVRSCH
HPPD_PSESP        -----KA LFK-SIERDQ --VRRGVLSL -D
MELA_SHECO        -----KA LFK-SIERDQ --VRRGVL
PEAJ_MOUSE        VYKPVCEPEA LPSLAFFDQK RPALKAEFDK FVSEEDTVPL SHLDESPTLL

```

HPPD\_Hv  
 HPPD\_Ath  
 HPPD\_HUMAN  
 HPPD\_RAT  
 HPPD\_PIG  
 HPPD\_MOUSE  
 HPPD\_PSESP  
 MELA\_SHECO  
 PEAJ\_MOUSE

560

570

PELTGPAPPF GHRGGYST

**Key:**

HPPD\_Hv: *Hordeum vulgare* 4-hydroxyphenylpyruvate  
 dioxygenase (HvSD36) SEQ ID NO: 2  
 HPPD\_Ath: *Arabidopsis thaliana*  
 4-hydroxyphenylpyruvate dioxygenase  
 HPPD\_HUMAN: *H.sapiens* 4-hydroxyphenylpyruvate  
 dioxygenase  
 HPPD\_PIG: pig 4-hydroxyphenylpyruvate dioxygenase  
 HPPD\_RAT: rat P alloantigen  
 HPPD\_MOUSE: mouse 4-hydroxyphenylpyruvate  
 dioxygenase  
 MELA\_SHECO: *S. colwelliana* mela protein  
 HPPD\_PSESP: *Pseudomonas* sp. (strain P.J.874)  
 4-hydroxyphenylpyruvate dioxygenase  
 PEAJ\_MOUSE: *Mus musculus* (mouse) PEA3 polypeptide

The greatest homology was with the *Arabidopsis* sequence,  
 viz. 58% over the entire sequence (62% over 412 amino  
 acids), followed by HPPD\_RAT with 35% (over 365 amino  
 acids), HPPD\_HUMAN 34% (over 365 amino acids), HPPD\_MOUSE  
 34% (over 371 amino acids).

**Please amend paragraph 1-5, on page 25 of the specification as followed:**

**SEQ ID NO: 2**

HFPD\_EV  
 HFPD\_Ath  
 HFPD\_HUMAN  
 HFPD\_RAT  
 HFPD\_PIG  
 HFPD\_MOUSE  
 HFPD\_PSESP  
 MELA\_SHECO  
 PEAS\_MOUSE

260	270	280	290	300
VFFLPGFBNV	THPDA----	VDFGLTRFDH	VVGWVP--EL	-AFAAAYIAG
SEFLPGFERNV	EDASSF--P	LOYGIRHLDH	AVGNVP--EL	-GPALTYVAG
GQFLPGYRAP	AFMDPILLPKL	PKCSLEMDH	IVGNQPDQEM	--VSASEW----
GRFLPGFRAAP	TYKDTLLPKL	PSCHLESIIDH	IVGNQPDQEM	--ESASEW----
LDSPQPSQT	LLHRLLSKL	PKCGLESIIDH	IVGNQPDQEM	--EASQW----
GRFLPGFEAP	TYKDTLLPKL	PKCHLESIIDH	IVGNQPDQEM	--QSASEW----
IDFV--PLGG	VDRHPVGA--	--GLKIIDH	LTHNVYIRRN	-A---YWNF
SDF-----KA	LDRPITIQ	-EKGFLVDH	LTHNVHGTN	-E---YWSF
HGTLGRHSSV	FQGPVMDCHS	FTSPQGGGRS	PLPAPYQRL	SEPCFPYPQO

SEQ ID NO: 2

HPPD\_Ev  
HPPD\_Ath  
HPPD\_HUMAN  
HPPD\_RAT  
HPPD\_PIG  
HPPD\_MOUSE  
HPPD\_PSESP  
NELA\_SHECO  
PEA3\_MOUSE

310	320	330	340	350
FT—GFHNF	AEFTADVGT	TESGLEBVVL	ANMERGVLLP	LNEFVGTGR
FT—GFBNF	AEFTADVGT	ABSGLEBAVL	ASHDEMVLLP	INEFVGTGR
YLNLOFBNF	WEVDOTQVET	EYSGLRSIVV	ANYESISIMP	INEPAPG-KK
YLNLOFBNF	WEVDOTQVET	EYSGLRSIVV	ANYESISIMP	INEPAPG-RK
YLNLOFBNF	WEVDOTQVET	EYSGLRSIVV	ANYESISIMP	INEPAPG-KK
YLNLOFBNF	WEVDOTQVET	EYSGLRSIVV	ANYESISIMP	INEPAPG-RK
YKLFPHBNF	RYF—DIEG	EYTGLETKAM	TAPDGNIRIP	LNE—ESSKG
YKDFPGTSV	RYF—DIEG	SYTALISIAL	RSPDGSFCIP	INE—GKGGD
WYFQ—SYHNF	LYEQAGOPAS	SQGGVSGHRI	PGAGVVIKOS	RYDFAKOSD

**SEQ ID NO: 2**

HPPD\_EV  
HPPD\_Ath  
HPPD\_HUMAN  
HPPD\_RAT  
HPPD\_PIG  
HPPD\_MOUSE  
HPPD\_PSESP  
MELA\_SHECO  
PRA1\_MOUSE

360	370	380	390	400
RSQIQTFLEH	BGGPGVQH-I	AVASSDVLAT	LREMRARSH	GGPDTLFFPL
RSQIQTFLEH	NEGAGLOH-L	ALMHEDIFAT	LREMRKRSSI	GGPDMFSPFP
RSQIQEYVDY	HGGAGVQH-I	ALKTEDIITA	IRHLER	-GUEFLSVF-
RSQIQEYVDY	HGGAGVQH-I	ALKTEDIITP	IRHLER	-GUEFLAVP-
RSQIQEYVDY	HGGAGVQH-I	ALKTEDIITA	IRHLER	-GUEFLAVP-
RSQIQEYVDY	HGGAGVQH-I	ALKTEDIITA	IRHLER	-GUEFLAVP-
AGQIEEFLNQ	FGGDSIGH-V	AFESDOLITA	WHLKSI	-GKSTIAFF
RQOIDEYLKE	YDQGVQH-L	AFHSRDIVAS	LDAMGGS	-SIGTLDIIP
PGCASHLEP	BGFSGSPGD	GVNCTGYERS	LAPPDDWCJ	VPKVEGGIX

**SEQ ID NO: 2**

HPPD\_EV  
 HPPD\_Ath  
 HPPD\_HUMAN  
 HPPD\_RAT  
 HPPD\_PIG  
 HPPD\_MOUSE  
 HPPD\_PSEXP  
 MELA\_SHECO  
 PRA3\_MOUSE

410	420	430	440	450
PRTYGVRL	AGD--VLSEA	QINBCQELGV	LVDREDDG	--VLL--
PTTYQLKKR	VGD--VLSDD	QINCEKELGI	LVDREDDG	--VLL--
STTYQLREK	LATAKIVKE	NIDALSELKI	LVDYDEKG	--VLL--
SSTYLLREN	LATYKIQVKE	NHVDLSLKI	LVDYDEKG	--VLL--
PTTYQLQRE	LSAKIRVKE	SIDVLEELKI	LVDYDEKG	--VLL--
SSTYALLRE	LSAKIQVKE	SNVDLEELKI	LVDYDEKG	--VLL--
DTTYMLRGR	LPH--HGH	PVGHQIANGI	LLOGSSSGD	KRLI--
E-YTDIFER	LPG--VTE	DRDRIKHQI	LVDGDHGD	--VLL--
QEGIGAFRG	PPTQR--	-RGALQELMOF	LYALLDSTN	ABPTANTGRG

**SEQ ID NO: 2**

HFFD\_RV  
HFFD\_Ath  
HFFD\_HUMAN  
HFFD\_RAT  
HFFD\_PIG  
HFFD\_MOUSE  
HFFD\_PSESP  
MELA\_SHECO  
PRA3\_MOUSE

460	470	480	490	500
QIFTAPVGDR	PTLFLENIOR	IGCHMKDERG	HE---YQSG	OCGGPGKGNF
QIFTAPLQDR	PTIPINIIOR	VGCHMKDERG	KA---YQSG	OCGGPGKGNF
QIFTAPVQDR	PILFLEVIOR	HNEQ-----	-----	---GFGAGNF
QIFTAPNQDR	PILFLEVIOR	HNEQ-----	-----	---GFGAGNF
QIFTAPNQDR	PTVPLEVIOR	HNEQ-----	-----	---GFGAGNF
QIFTAPNQDR	PTLFLEVIOR	HNEQ-----	-----	---GFGAGNF
QIFSETLMGP	---VFPEIOR	---KGDD-----	-----	---GFGAGNF
QIFTKNLPGP	---IPIRIIR	---KML-----	-----	---GFGAGNF
MEFKLIEPPE	VARLNGIQRM	RFAMNYDKLS	BSLRYYYKGG	INQSVAGHRY

Please amend paragraph 1-5, on page 24 of the specification as followed:

SEQ ID NO: 2		10	20	30	40	50
HFFD_Hv	.....	.....	.....	.....	MP	PTPTTFAATG
HFFD_Ath	.....	.....	.....	.....	..MCHQAA	VSEWQHDDG
HFFD_HUMAN	.....	.....	.....	.....	.....	.....
HFFD_RAT	.....	.....	.....	.....	.....	.....
HFFD_PIG	.....	.....	.....	.....	.....	.....
HFFD_MOUSE	.....	.....	.....	.....	.....	.....
HFFD_PSESP	.....	.....	.....	.....	.....	.....
MELA_SHECO	.....	.....	.....	.....	.....	.....
PEA3_MOUSE	MTKSSNHCL	LRPENKPLN	GPGAQAASLR	PSPATLVSS	PGHAEPFPA	

SEQ ID NO: 2		60	70	80	90	100
HFFD_Hv	AAAAVTPEHA	RPHKVRVFW	RSDRFTLSF	HEVEFWCADA	ASAGRFAPA	
HFFD_Ath	AASPGFKLV	GFSPVREMP	KSKFKVVRP	HHKFWCGDA	THVARRFSWG	
HFFD_HUMAN	M	TTYSKQAKP	ERGRFLH--P	HSVTFWVGH	KQAASFYCSK	
HFFD_RAT		IWDEGQPKP	ERGRFLH--P	HSVTFWVGH	KQAASFYCHK	
HFFD_PIG	M	TSYSDKQKP	ERGRFLH--P	HSVTFWVGH	KQAASFYCHK	
HFFD_MOUSE	M	TYTHKQPKP	ERGRFLH--P	HSVTFWVGH	KQAASFYCHK	
HFFD_PSESP			ADLYEMP	MGLKGFPIE	LASPTFWLIS	
MELA_SHECO			MASEQNP	LGLLGIEFTS	FATPDLPFNE	
PEA3_MOUSE	PAQTGPGQVS	ASARGPGPVA	GCSGRMERN	KGYL----	DQ	KVPTTFCSEK

SEQ ID NO: 2		110	120	130	140	150
HFFD_Hv	LGAPLAARSD	LSTGSAHAS	QLLRSGHLAF	LFT--APTAN	G-CDAA--	
HFFD_Ath	LGMFPAKSD	LSTGMVHAS	YLLTSGQLRF	LFT--APTSP	S--LSAGEIKP	
HFFD_HUMAN	MGFEPLAYRG	LETGSRVVVS	HVIRQKIVT	VLS--SA--	-----LNP	
HFFD_RAT	MGFEPLAYRG	LETGSRVVVS	HVIRQKIVT	VLC--SA--	-----LNP	
HFFD_PIG	IGFEPLAYRG	LETGSRVVVS	HVIRQKIVT	VFS--SA--	-----LNP	
HFFD_MOUSE	MGFEPLAYRG	LETGSRVVVS	HVIRQKIVT	VLC--SA--	-----LNP	
HFFD_PSESP	PIFINGPTK	VATRSKDV	ELYRQGAHL	ILN--SB--	-----LNP	
MELA_SHECO	KVFIDPGPSK	LKKHKQDI	VYTRQNDIM	LLN--SB--	-----LNP	
PEA3_MOUSE	PGNGSLGAL	MVPGKLMDF	GELPSSDSF	LPQOLSHPQ	TWLAEQVDF	

SEQ ID NO: 2		160	170	180	190	200
HFFD_Hv	--TASLPSFS	ADAARRPSAD	HGIAVRSVL	RVADAAEAFR	ASRRGRARPA	
HFFD_Ath	TTTASLPSFD	HGSCRFPS	HGLGVRAVAI	EVEDARSAFS	ISVARGAIPS	
HFFD_HUMAN	-----WN	KEMGDHL-VK	HGDGVKDIAF	EVEDCDIIVQ	KARERGAKIM	
HFFD_RAT	-----WN	KEMGDHL-VK	HGDGVKDIAF	EVEDCEHIVQ	KARERGAKIV	
HFFD_PIG	-----WN	KEMGDHL-VK	HGDGVKDIAF	EVEDCDIIVQ	KARERGAKIV	
HFFD_MOUSE	-----WN	KEMGDHL-VK	HGDGVKDIAF	EVEDCDIIVQ	KARERGAKIV	
HFFD_PSESP	-----P	HVASTFAAE	HGPSVCGMAF	RVKDSQKATK	RALELGAQFI	
MELA_SHECO	-----K	QGFSAQFAKT	HGPAISSMZN	HVEDANFAFE	GAVARGAKPA	
PEA3_MOUSE	SDEQTVDFPM	-----SENLAFF	SPTRIKKFP	QSPRTOPALS	CSKQVPLPYH	

SEQ ID NO: 2		210	220	230	240	250
HFFD_Hv	FAPV-----	-----DLGRG	FAPAKVELYC	-----DVVLRFVS	HP--DG--TD	
HFFD_Ath	SPPI-----	-----VLREA	VFLAEVELYC	-----DVVLRYVS	YKAEOT--SK	
HFFD_HUMAN	REF-----	-----WVEQDKFGK	VKFAVLQTYG	-----DTTHZLVE	KIM--YT	
HFFD_RAT	REF-----	-----WVEQDKFGK	VKFAVLQTYG	-----DTTHZLVE	KIM--YT	
HFFD_PIG	REHVC-CAAD	VRGHTPLDR	AR--QVME	-----GT--LVE	KMT--FC	
HFFD_MOUSE	REF-----	-----WVEQDKFGK	VKFAVLQTYG	-----DTTHZLVE	KIM--YT	
HFFD_PSESP	HI-----	-----ETGPM	LHLPAIKGIG	-----GAPFLID	RFSGSSSIYD	
MELA_SHECO	AD-----	-----TV--KD	LFYPAITGIG	-----DGLIYFID	TFGDDHNIYT	
PEA3_MOUSE	HGEQCLYSRQ	IAIKSPAPCA	PGQSFLQPPS	RABQQQLLR	ASSSSQSHPG	